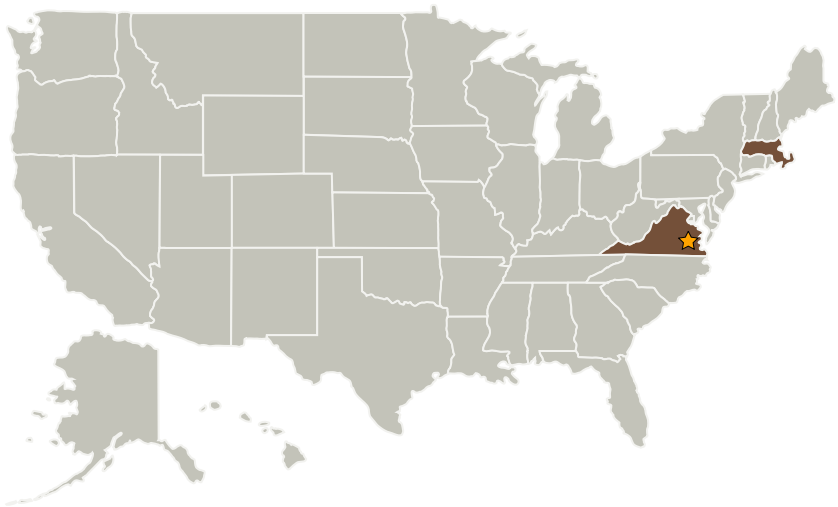
Micromechanical Models for Composite NDE and Diagnostics, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

Modern aircraft increasingly rely on composite components, due to their excellent material properties. However, fastening/joining and design methodologies in current use are artifacts of metallic aircraft component use and are not yet optimized for use with composites. Furthermore, limitations in our current ability to observe manufacturing quality and in-service damage evolution of composite structures may prevent designers from realizing their full potential. Current NDE practices are incapable of overcoming these limitations. Thus, a new framework and methodology is needed for high resolution imaging and tracking of manufacturing quality and damage evolution. The goal of this program is to enable assessment of the matrix, fiber, and bonding conditions for composites using a combination of detailed physics based models, high resolution imaging, and controlled loading sources to isolate the composite characteristic of interest. In Phase I we will focus on magnetic field sensing (i.e., eddy-current) methods that can be combined with structural analysis to enhance the diagnostic capabilities of these NDE methods. JENTEK and MR&D are well-positioned to deliver this methodology in the form of commercial software and NDE equipment. We will also work with a major aircraft OEM to maintain our focus on practical solutions to high priority needs.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
JENTEK Sensors, Inc.	Supporting Organization	Industry	Waltham, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.2 Computational Materials